UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/825,113	04/16/2004	Sebastien Roy	08400-024 GP/cm	7712

7590 08/24/2007

BROUILLETTE KOSIE PRINCE
25th Floor
1100 Rene-Levesque Blvd. West
Montreal, H3B 5C9
CANADA

EXAMINER	
SMITH, JEFFREY S	
ART UNIT	**PAPER NUMBER**
2624	

MAIL DATE	DELIVERY MODE
08/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/825,113	ROY ET AL.	
	Examiner	Art Unit	
	Jeffrey S. Smith	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 April 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 April 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

New corrected drawings in compliance with 37 CFR 1.121(d) are required in this application because the drawings fail to comply with the standards required in 37 CFR 1.84. For example, the shading and letters used in the drawings are improper, as in figures 11(a)-(g) among others. This is only an example, many of the drawings are difficult if not impossible to read, and every drawing must satisfy every requirement of 37 CFR 1.84.

Applicant is advised to employ the services of a competent patent draftsperson outside the Office, as the U.S. Patent and Trademark Office no longer prepares new drawings. The corrected drawings are required in reply to the Office action to avoid abandonment of the application. The requirement for corrected drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-17 are rejected under 35 U.S.C. 102(b) as being anticipated by "The Office of the Future: A Unified Approach to Image-Based Modeling and Spatially Immersive Displays" by Raskar et al. published by Computer Graphics Proceedings, Annual Conference Series, July 1998, pages 1-10. ("Raskar").

Raskar discloses a method for displaying an undistorted, projector image on a surface of unknown geometry, comprising: capturing an image of the surface from the point of view of an observer (see for example section 3 on page 4, "When in capture mode, the projectors and cameras can be used together to obtain per-pixel depth and reflectance information from the designated display surface"); establishing a mapping between pixels of the captured image and pixels of the projector image (page 4, "The 3D coordinates of the surface points imaged at every pixel are later used with color information to complete the image-based model"); displaying the target image on the surface, said display of the target image comprising correcting the target image in relation to the established mapping to display on the surface corresponding to the target image from the point of view of the observer (page 6, "The resulting image, when displayed by the projector, will produce the desired image for the viewer").

For claim 2, Raskar discloses a method of allowing at least one projector to display an undistorted, target image on a surface of unknown geometry, comprising: capturing, by means of a camera, an image of the surface from the point of view of an observer; establishing a mapping between pixels of the image from the camera and pixels of a projector image; projecting the target image on the surface using the projector, said projection of the target image comprising correcting the target image in

relation to the established mapping to display on the surface a target image undistorted from the point of view of the observer (see sections 3 and 4).

For claim 3, Raskar discloses establishing a mapping comprises establishing a mapping between each pixel of the projector image and each pixel of the camera image (see section 3.1, "The 3D coordinates of the surface points imaged at every pixel are later used with color information to complete the image-based model").

For claim 4, Raskar discloses establishing a mapping comprises establishing an inverse mapping from pixels of the projector image to pixels of the camera image; and said method comprises constructing the projector image on the basis of the inverse mapping (see section 3.4).

For claim 5, Raskar discloses establishing a mapping comprises projecting, by means of said at least one projector, at least one pattern on the surface; said at least one pattern providing an encoding of the pixel position of the projector image (the structured light is used to do this as discussed in sections 3.1 and 3.2).

For claim 6, Raskar discloses the projected pattern comprises alternate black and white stripes (see figure 4).

For claim 7, Raskar discloses a plurality of projectors are used in projecting the target image on the surface (see figure 8).

For claim 8, Raskar discloses a system for allowing at least one projector to display an undistorted, target image on a surface of unknown geometry, comprising: a camera for capturing an image of the surface from the point of view of an observer; a producer of a mapping between pixels of the camera image and pixels of a projector

image; said at least one projector for projecting the target image on the surface using the projector, said system comprising a corrector of the target image projected by the at least one projector in relation to the established mapping to display on the surface a target image undistorted from the point of view of the observer (see figures 5, 6, and 7).

For claim 9, Raskar discloses the camera is a digital still camera or a digital video camera (see figure 5).

For claim 10, Raskar discloses the projector is selected from the group consisting of a digital video projector, a laser point projector or a laser stripe projector.

For claim 11, Raskar discloses the mapping producer establishes a mapping from each pixel of the projector image to a pixel of the camera image (see figures 5 and 6).

For claim 12, Raskar discloses the mapping producer establishes an inverse mapping from pixels of the projector image to pixels of the camera image; and said system comprises a producer of the projector image on the basis of the inverse mapping (see figure 7).

For claim 13, Raskar discloses when the camera captures an image of the surface, the at least one projector projects a pattern on the surface (see figure 5).

For claim 14, Raskar discloses the projected pattern comprises alternate black and white stripes (see figure 4).

For claim 15, Raskar discloses a plurality of projectors to project the target image on the surface (see figure 8).

For claim 16, Raskar discloses that at least one of said camera and said projector is uncalibrated with respect to the surface and the other of said projector and said camera (see figure 7).

For claim 17, Raskar discloses a method for displaying an undistorted, target image on a surface of unknown geometry, comprising: capturing an image of the surface from the point of view of an observer; establishing a mapping between pixels of the captured image and pixels of the target image, taking into consideration respective positions of the observer and surface; displaying the target image on the surface, said display of the -target image comprising correcting the target image in relation to the established mapping to display on the surface a target image undistorted from the point of view of the observer as shown in figures 5-8.

Claims 1-17 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent Number 6,709,116 issued to Raskar et al. ("Raskar 116").

Raskar 116 discloses capturing an image of the surface from the point of view of an observer; establishing a mapping between pixels of the captured image and pixels of the projector image; displaying the target image on the surface, said display of the target image comprising correcting the target image in relation to the established mapping to display on the surface corresponding to the target image from the point of view of the observer as shown in figure 3.

For claim 2, Raskar 116 discloses capturing, by means of a camera, an image of the surface from the point of view of an observer; establishing a mapping between

pixels of the image from the camera and pixels of a projector image; projecting the target image on the surface using the projector, said projection of the target image comprising correcting the target image in relation to the established mapping to display on the surface a target image undistorted from the point of view of the observer as shown in figure 3.

For claim 3, Raskar 116 discloses establishing a mapping comprises establishing a mapping between each pixel of the projector image and each pixel of the camera image as shown in figures 3 and 4.

For claim 4, Raskar 116 discloses establishing a mapping comprises establishing an inverse mapping from pixels of the projector image to pixels of the camera image; and said method comprises constructing the projector image on the basis of the inverse mapping as shown in figures 3 and 11.

For claim 5, Raskar 116 discloses establishing a mapping comprises projecting, by means of said at least one projector, at least one pattern on the surface; said at least one pattern providing an encoding of the pixel position of the projector image as shown in figures 3 and 5.

For claim 6, Raskar 116 discloses the projected pattern comprises alternate black and white stripes as shown by structured pattern projector 310 in figure 3.

For claim 7, Raskar 116 discloses a plurality of projectors are used in projecting the target image on the surface as shown in figure 5.

For claim 8, Raskar 116 discloses a camera for capturing an image of the surface from the point of view of an observer; a producer of a mapping between pixels

of the camera image and pixels of a projector image; said at least one projector for projecting the target image on the surface using the projector, said system comprising a corrector of the target image projected by the at least one projector in relation to the established mapping to display on the surface a target image undistorted from the point of view of the observer as shown in figure 3.

For claim 9, Raskar 116 discloses the camera is a digital still camera or a digital video camera as shown in figure 1.

For claim 10, Raskar 116 discloses the projector is selected from the group consisting of a digital video projector, a laser point projector or a laser stripe projector as shown in figure 1.

For claim 11, Raskar 116 discloses the mapping producer establishes a mapping from each pixel of the projector image to a pixel of the camera image as shown in figure 3.

For claim 12, Raskar 116 discloses the mapping producer establishes an inverse mapping from pixels of the projector image to pixels of the camera image; and said system comprises a producer of the projector image on the basis of the inverse mapping as shown in figures 3 and 5.

For claim 13, Raskar 116 discloses when the camera captures an image of the surface, the at least one projector projects a pattern on the surface as shown in figures 1, 3 and 5.

For claim 14, Raskar 116 discloses the projected pattern comprises alternate black and white stripes as shown by structured pattern projector 310 in figure 3.

For claim 15, Raskar 116 discloses a plurality of projectors to project the target image on the surface as shown in figure 5.

For claim 16, Raskar 116 discloses at least one of said camera and said projector is uncalibrated with respect to the surface and the other of said projector and said camera as shown in figure 3.

For claim 17, Raskar 116 discloses capturing an image of the surface from the point of view of an observer; establishing a mapping between pixels of the captured image and pixels of the target image, taking into consideration respective positions of the observer and surface; displaying the target image on the surface, said display of the -target image comprising correcting the target image in relation to the established mapping to display on the surface a target image undistorted from the point of view of the observer as shown in figure 3.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent Number 7,001,023 issued to Lee et al. contains claim 6, which is patentably nearly identical to claim 5 of this application. For example, the similarities between claim 6 of the patent, (which depends from claim 1), and claim 5 of this application, (which depends from claim 2), are shown below by mapping the elements of this application's claim 5 (shown in italics) to the patent's claim 6.

1. A method for determining correspondence between locations on a display surface having an arbitrary shape and pixels in an output image of a projector, comprising:

projecting a set of known calibration patterns onto the display surface *(*see claim 5 of this application, *projecting, by means of said at least one projector, at least one pattern on the surface; said at least one pattern providing an encoding of the pixel position of the projector image)*;

sensing directly an intensity of light at each of a plurality of locations on the display surface for each calibration pattern, there being one discrete optical sensor associated with each location, and in which the optical sensor is coupled to the corresponding location by an optical fiber *(*see claim 2 of this application, *capturing, by means of a camera, an image of the surface from the point of view of an observer)*; and

correlating the intensities at the locations to determine correspondences between the plurality of locations and pixels in an output image of the projector (see claim 2 of this application, *establishing a mapping between pixels of the image from the camera and pixels of a projector image).*

6. The method of claim 1, further comprising: warping an input image to the projector according to the correspondences; and projecting the warped input image on the display surface to appear undistorted *(*see claim 2 of this application, *projecting the target image on the surface using the projector, said projection of the target image comprising correcting the target image in relation to the established mapping to display on the surface a target image undistorted from the point of view of the observer).*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey S. Smith whose telephone number is 571 270-1235. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571 272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JSS
August 15, 2007

JINGGE WU
SUPERVISORY PATENT EXAMINER